

CLAIMS

1. A fuel cell system comprising:
a fuel cell stack having an anode and a cathode;
5 a first and a second supply passages which communicate with each other in the fuel cell stack and supply fuel gas to the anode, respectively;
an exhaust passage which is connected to the second supply passage and discharges exhaust gas from the anode;
10 an opening and closing unit which opens and closes the exhaust passage; and
a flow amount controlling unit which controls flow amounts of the fuel gas passing through the first supply passage and the second supply passage, respectively,
15 wherein the flow amount controlling unit varies a ratio between the flow amounts passing through the first supply passage and the second supply passage, when the exhaust passage is closed.
2. The fuel cell system according to claim 1, wherein the
20 first and the second supply passages are provided such that the fuel gas supplied from the first supply passage and the second supply passage flow in opposite directions within the anode.
3. The fuel cell system according to claim 1 or 2, wherein
25 the flow amount controlling unit controls the flow amount such that an extreme downstream position of the fuel gas coincides with a position at which the exhaust passage is connected to the second supply passage, when the opening and closing unit is open.
- 30 4. The fuel cell system according to any one of claims 1 to 3, wherein the flow amount controlling unit controls the flow amounts such that the flow amounts of the fuel gas intermittently vary.

5. The fuel cell system according to claim 4, wherein the flow amount controlling unit shifts a time period in which the fuel gas is supplied to the anode through the first supply passage from a time period in which the fuel gas is supplied to the anode through the second supply passage.

6. The fuel cell system according to any one of claims 1 to 5, further comprising an flow amount calculating unit which calculates a required flow amount of the fuel gas to be supplied to the fuel cell stack based on a state of the fuel cell stack, wherein the flow amount controlling unit controls the flow amounts of the fuel gas such that a total of the flow amounts of the fuel gas supplied from the first and the second supply passages to the anode corresponds to the required flow amount calculated by the flow amount calculating unit.

7. The fuel cell system according to any one of claims 1 to 6, wherein the exhaust passage is connected to the second supply passage at the position between the fuel stack and the opening and closing unit.

8. A method of supplying fuel gas to a fuel cell system comprising a fuel cell stack having an anode and a cathode; a first and a second supply passages which communicate with each other in the fuel cell stack and supply fuel gas to the anode, respectively; and an exhaust passage which is connected to the second supply passage and discharges exhaust gas from the anode, the method comprising the steps of:

a step of opening and closing the exhaust passage; and a step of controlling flow amounts of the fuel gas passing through the first supply passage and the second supply passage, respectively,

wherein the step of controlling flow amounts varies a ratio between the flow amounts passing through the first supply passage

and the second supply passage, when the exhaust passage is closed.